Application No.: 10/088,894 9/23/99 Docket No.: 20459-00351-US

In the Claims

Please cancel claims 1-20 without prejudice or disclaimer as to the subject matter contained therein.

Please add the following new claims 21-37:

21. (New) A flick ramming method of loading an artillery piece with a projectile component in the form of either a shell or a propellant powder charge, the method comprising:

providing electromechanical energy from an electric motor;

converting a rotational acceleration of the electric motor into a rectilinear acceleration; and

applying the rectilinear acceleration to the projectile component to accelerate the projectile component to a ramming velocity inside a barrel of the artillery piece during a loading operation.

22. (New) The method of claim 21, further comprising:

accumulating energy in an energy accumulator;

converting energy released from the energy accumulator to a rectilinear acceleration; and

simultaneously releasing the energy accumulated in the energy accumulator and combining the rectilinear acceleration of the energy accumulator with the rectilinear acceleration of the electric motor in a loading direction of the projectile component to accelerate the projectile component to the ramming velocity.

23. (New) The method of claim 21, wherein said accumulating energy in an energy accumulator comprises compressing at least one spring.

24. (New) The method of claim 21, further comprising, after the loading operation has been completed, using the electric motor to reaccumulate energy in the energy accumulator.

25. (New) An apparatus for flick loading an artillery piece with a projectile component in the form of either a shell or a propellant powder charge, the apparatus comprising:

an electric motor having a rotational acceleration;

mechanical conversion means for converting the rotational acceleration of the electric motor into a linear acceleration; and

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a rammer operatively coupled to the mechanical conversion means,

said rammer applying the linear acceleration to the projectile component in a manner which imparts a ramming velocity to the projectile component within a barrel of the artillery piece.

26. (New) The apparatus of claim 25, further comprising an energy accumulator coupled to the rammer,

said energy accumulator being arranged and adapted to release stored energy in a manner which augments the linear acceleration resulting from the conversion of the rotational acceleration of the electric motor, and which thereby assists in imparting the ramming velocity to the projectile component,

said energy accumulator releasing the stored energy simultaneously with a starting of the electric motor.

27. (New) The apparatus of claim 25, wherein said electric motor comprises a geared-down electric motor coupled to the mechanical conversion means.

28. (New) The apparatus of claim 25, wherein the mechanical conversion means for converting the rotational acceleration of the electric motor into a linear acceleration comprises:

a first feed chain running in a closed loop in a desired loading direction of the projectile component and being arranged to drive the rammer;

a first chain wheel connected to an output shaft of the electric motor and around which the first feed chain runs;

a second chain wheel arranged in a running direction of the first feed chain and around which the first feed chain also runs;

a second feed chain mechanically coupled to the energy accumulator, said second feed chain being in a closed loop which runs parallel to the first feed chain around third and fourth chain wheels, one of said third and fourth chain wheels being mounted on a same spindle as the second chain wheel of the first feed chain;

said third and fourth chain wheels being arranged to rotate and drive in a same direction when they are acted on by either the electric motor or the energy accumulator.

29. (New) The apparatus of claim 28, wherein a movement of the first and second feed chains activated by the electric motor in a direction opposite to the loading direction results in an accumulation of energy in the energy accumulator while the shell rammer returns to a starting position,

wherein a movement of the first and second feed chains in the loading direction brings about an acceleration of the rammer and the projectile component while energy is supplied from both the electric motor and the energy accumulator.

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30. (New) An loader for flick loading an artillery piece with a projectile component in the form of either a shell or a propellant powder charge, the apparatus comprising:

a feed chain running around first and second chain wheels in a closed loop, wherein the second chain wheel is suitably arranged for either driving the feed chain during a projectile component loading operation, or for being driven by the feed chain during an energy charging operation;

an electric motor (2) arranged to drive the feed chain via the first chain wheel;

a shell rammer (6a) connected to the feed chain;

a planetary gear (13) connected to the second chain wheel of the feed chain and having an output shaft;

a crank arm (14) connected to the output shaft of the planetary gear; and

a compressible element (7b) connected between an outer end of the crank arm and a fixed fastening point on the loader.

31. (New) The loader of claim 30, wherein a full stroke length of the compressible element corresponds to half a revolution of the output shaft of the planetary gear and the crank arm connected to the end of the output shaft,

wherein, when the crank arm is in a starting position which corresponds to a starting position of the shell rammer, the compressible element is in a compressed position such that the crank arm forms an angle with respect to a line connecting the fixed fastening point on the loader and the output shaft of the planetary gear,

wherein, when the crank arm is in a stopping position which corresponds to a stopping position of the shell rammer, the compressible element remains in a compressed position

resulting from utilizing braking energy released during a braking operation of th shell rammer, after the projectile component has been accelerated into a final loading position.

32. (New) The loader of claim 30, wherein the electric motor is arranged to be driven in either a loading direction which accelerates the projectile component into a ramming position, or in an energy recharging direction which compresses the compressible element.

33. (New) The loader of claim 30, further comprising:

a feed chain which drives the shell rammer;

a stop connected to the feed chain which brakes the projectile component being loaded by the loader,

wherein energy supplied to the stop during braking of the projectile component is utilized to drive the planetary gear in a direction which aids the electric motor in further compressing the compressible element to a charged condition.

34. (New) The apparatus of claim 25, wherein said mechanical conversion means for converting the rotational acceleration of the electric motor into a linear acceleration comprises a pinion which is driven by the electric motor, said pinion being arranged to bear against a first rack connected to the rammer,

wherein the energy accumulator comprises at least one spring and a second rack which is displaceable relative at least with respect to the first rack when the at least one spring is not a fixed position,

wherein the energy accumulator is operatively coupled to a drive shaft of the electric motor via one or more pinions.

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35. (New) The apparatus of claim 25, wherein said mechanical conversion means for converting the rotational acceleration of the electric motor into a linear acceleration comprises:

a pinion mounted on an output shaft of the electric motor; and

a rack which drives a displaceable frame,

said displaceable frame bearing a feed chain arranged to run around first and second chain wheels in a closed loop,

said displaceable frame being connected, in one of two parallel running portions, to a body of the apparatus in which the displaceable frame is displaceable and, in the other of the two parallel running portions, to the rammer,

wherein at least one energy accumulator is arranged between a fixed a fixed position of the apparatus and the displaceable frame.

36. (New) The apparatus of claim 26, further comprising means for starting a release of an energy supply from the energy accumulator at a same time as the electric motor is started.

37. (New) The apparatus of claim 26, further comprising means for loading the electric motor in a direction which brakes a triggering of the energy accumulator until a time of ramming when a current direction to the electric motor is reversed.